1969 OPERATING SUMMARY

GALT

water pollution control plant

TD227
G35
W38
1969
MOE
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a aa

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1970
WATER
MMISSION

ONTARIO WATER RESOURCES COMMISSION

Division of Plant Operations

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Water management in Ontario

Ontario
Water Resources
Commission

135 St. Clair Ave. W.
Toronto 195
Ontario

The operating efficiency and financial status of the water pollution control facilities operated for you in 1969 are presented in the following pages.

The regional operations engineer's comments and the statistical data will assist you in gauging the plant's level of performance. A new flow chart and up-to-date design data are also provided.

Various divisions and sections within the Commission have co-operated in providing what we trust is an accurate and concise annual operating summary.

D. S. Caverly,
General Manager.

D. A. McTavish, P. Eng.,
Director,
Division of Plant Operations.

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GALT

water pollution control plant

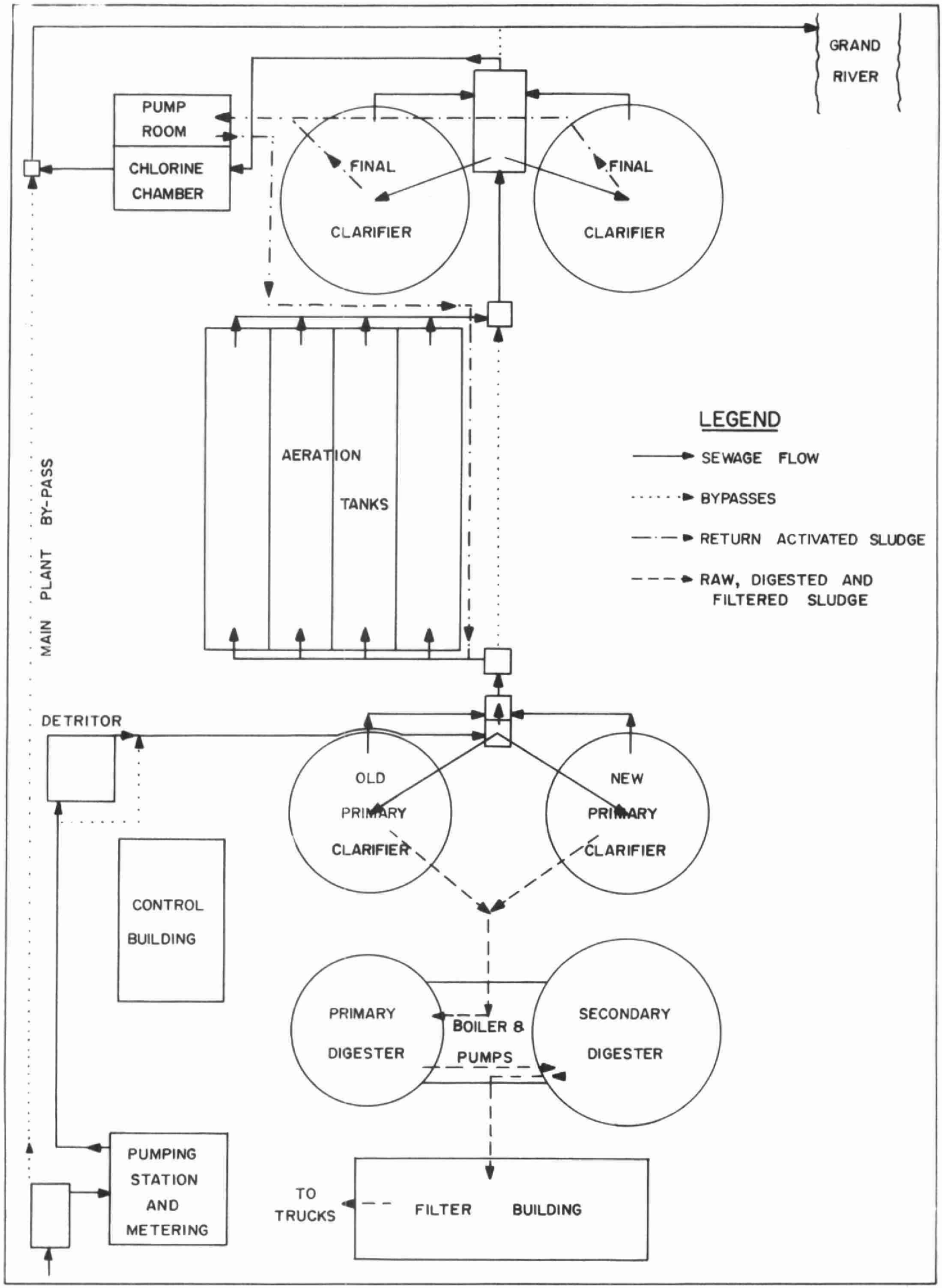
operated for

THE CITY OF GALT

by the

ONTARIO WATER RESOURCES COMMISSION

1969 ANNUAL OPERATING SUMMARY


GRAND RIVER
PUMP ROOM
CHLORINE CHAMBER
FINAL CLARIFIER
FINAL CLARIFIER
AERATION TANKS
MAIN PLANT BY-PASS
LEGEND
SEWAGE FLOW
BYPASSES
RETURN ACTIVATED SLUDGE
RAW, DIGESTED AND FILTERED SLUDGE
DETRITOR
OLD PRIMARY CLARIFIER
NEW PRIMARY CLARIFIER
CONTROL BUILDING
PRIMARY DIGESTER
BOILER & PUMPS
SECONDARY DIGESTER
PUMPING STATION AND METERING
TO TRUCKS
FILTER BUILDING

DESIGN DATA

PROJECT NO.	2-0090-61	TREATMENT	Activated Sludge
DESIGN FLOW	5.0 mgd	DESIGN POPULATION	34,000
BOD - Raw Sewage	250 mg/l	SS - Raw Sewage	250 mg/l
- Removal	90%	- Removal	90%

PRIMARY TREATMENT

Comminution

Type: C.P. Barminutor
Size: One Model C (36")

Raw Sewage Pumps

Type: Babcock-Wilcox
Size: Three 3500 gpm @ 30' tdh

Grit Removal

Type: Eimco Detritor
Size: One 18' x 18' x 2' deep
(4,000 gal)
Retention: 1.15 min

Primary Sedimentation

Type: (a) Dorr (old cl.)
(b) Eimco (new cl.)
Size: Two 60' dia x 9' swd
50,600 cu ft or 315,000 gal)
Retention: 1.5 hours
Loading: Surface, 884 gal/ft^2/day
Weir, 13,250 gal/ft/day

SECONDARY TREATMENT

Aeration Tanks

Type: Mechanical aeration
Single pass (5-cell)
Size: Four 150' x 30' x 13.7'
(234,000 cu ft or 1.46 mil gal)
Retention: 7.0 hours

Aerators

- Twenty Ames-Crosta

Secondary Sedimentation

Type: Eimco
Size: Two 75' dia x 10' swd
(88,400 cu ft or 550,000 gal)
Retention: 2.64 hours
Loading: Surface, 566 gal/ft^2/day
Weir, 10,600 gal/ft/day

CHLORINATION

- One F & P Automatic

Chlorine Contact Chamber

Size: One 49.25' x 21.5' x 7.25'
(46,000 gal)
Retention: 13.25 min

OUTFALL

- to Grand River

SLUDGE HANDLING

Digestion System

Type: Two-stage

Primary --
Type: Eimco draft tube mixers (2) on concrete roof
Size: One 50' dia x 20' swd (30,300 cu ft or 189,000 gal)

Secondary --
Size: One 70' dia x 20' swd (77,000 cu ft or 480,000 gal)

Vacuum Filter

Type: Eimco (cloth)
Size: One, 380 sq ft

'69 REVIEW

GENERAL

In 1969, a total flow of 1,996.6 million gallons was treated at a total cost of $94,613.16. Cost of treatment per million gallons was $43.35, while the cost per pound of BOD removed was three cents.

Under the supervision of head office engineers, the plant staff operated a clean, attractive and efficient plant for the City of Galt.

PLANT FLOWS and CHLORINATION

The plant treated an average flow of 6 mgd which is 120% of the design capacity of 5 mgd. The design flow was exceeded 80% of the time during the year. The average flow increased from 5.87 mgd in 1968 for an average increase of 0.13 mgd during 1969. Daily flows were recorded for 334 days and pro-rated for the rest of the year.

An average chlorine dosage rate of 2.8 mg/l was required to maintain an average chlorine residual of 0.5 mg/l in the final effluent.

PLANT EFFICIENCY

The raw sewage BOD and suspended solids concentrations averages were 140 mg/l and 144 mg/l respectively, while the raw sewage strengths in 1968 was 132 mg/l for BOD and 183 mg/l for suspended solids. The raw sewage design value of 250 mg/l for BOD was never exceeded during the year; its average of 140 mg/l was 56% of the design value. The average effluent concentration for BOD was 15 mg/l, which met the OWRC objective. Although this was exceeded 40% of the time, a reduction of 89% in

the BOD removal was experienced in 1969. This is similar to the 1968 reduction.

The average raw sewage suspended solids concentration was 144 mg/l or 57% of the design value of 250 mg/l; in 1968, the suspended solids concentration was 132 mg/l. The average suspended solids removal efficiency was 88%, resulting in an effluent suspended solids of 17 mg/l which exceeded the OWRC objective of 15 mg/l 30% of the time.

The average raw sewage BOD concentrations exceeded the 1968 average values by 60%. However, the suspended solids average concentrations were less than the 1968 average values by 21%.

The average primary effluent BOD and suspended solids concentrations were 97 mg/l and 52 mg/l respectively. The primary clarifier average BOD and suspended solids reduction efficiencies were 30.7% and 63.8% respectively.

The average MLSS concentration of 2,840 mg/l and F/M ratio of 0.14 are with the accepted limits of good aeration tank operation.

SLUDGE DIGESTION

An average of 0.23 mil. gal. of sludge was pumped each month to the primary digesters. The raw sludge averaged 6.7% total solids, of which 64% was volatile matter.

Digested sludge from secondary digesters averaged 4.0% total solids, of which 55% was volatile matter. The average reduction in volatile matter was 41.4%, which is favourable.

CONCLUSIONS

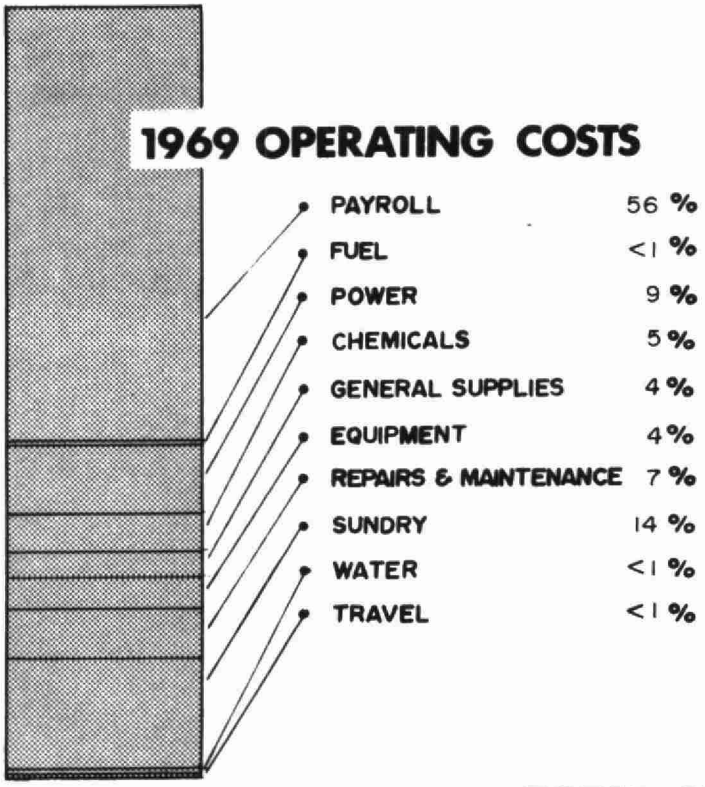
Despite the fact that the plant was hydraulically overloaded, the plant produced a good effluent during the year. Plans to expand the capacity of the plant continued.

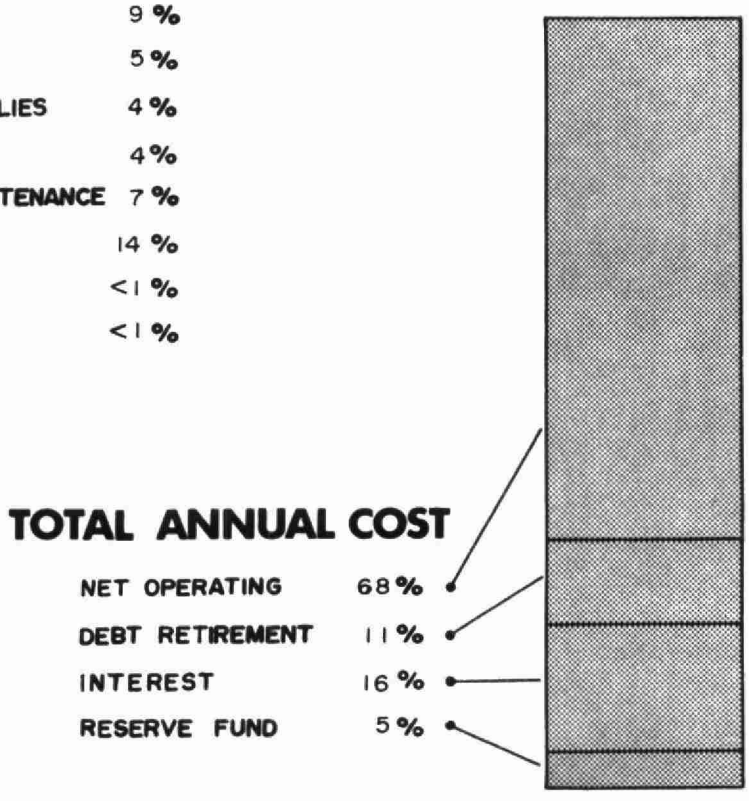
PROJECT COSTS

NET CAPITAL COST (Final)	$1,211,259.48
DEDUCT - Portion financed by CMHC/MDLB (Final)	804,340.16
Long Term Debt to OWRC	$ 406,919.32
Debt Retirement Balance at Credit (Sinking Fund) December 31, 1969	$ 115,102.32
Net Operating	$ 94,613.16
Debt Retirement	14,763.00
Reserve	7,557.49
Interest Charged	22,781.32
TOTAL	$ 139,714.97

RESERVE ACCOUNT

Balance @ January 1, 1969	$ 35,147.40
Deposited by Municipality	7,557.49
Interest Earned	2,147.36
	$ 44,852.25
Less Expenditures	1,539.26
Balance @ December 31, 1969	$ 43,312.99





Yearly Operating Costs

YEAR	MILLION GALLONS TREATED	TOTAL OPERATING COSTS	COST PER MILLION GAL	COST PER LB OF BOD REMOVED
1965	1853.9	$73,672.49	$39.74	4 cents
1966	1903.9	83,578.97	43.90	3 cents
1967	2079.5	99,195.65	47.70	4 cents
1968	2147.4	87,458.45	40.73	3 cents
1969	2182.6*	94,613.16	43.35	3 cents

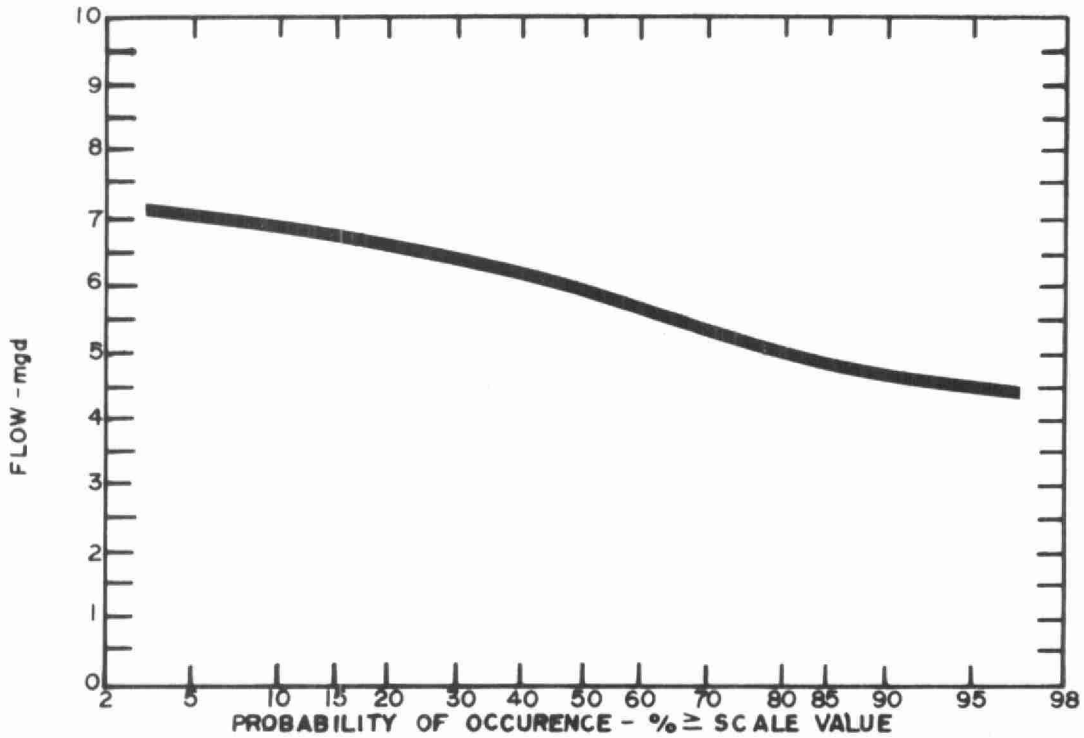
* Total includes prorated flow for 31 days

Monthly Operating Costs

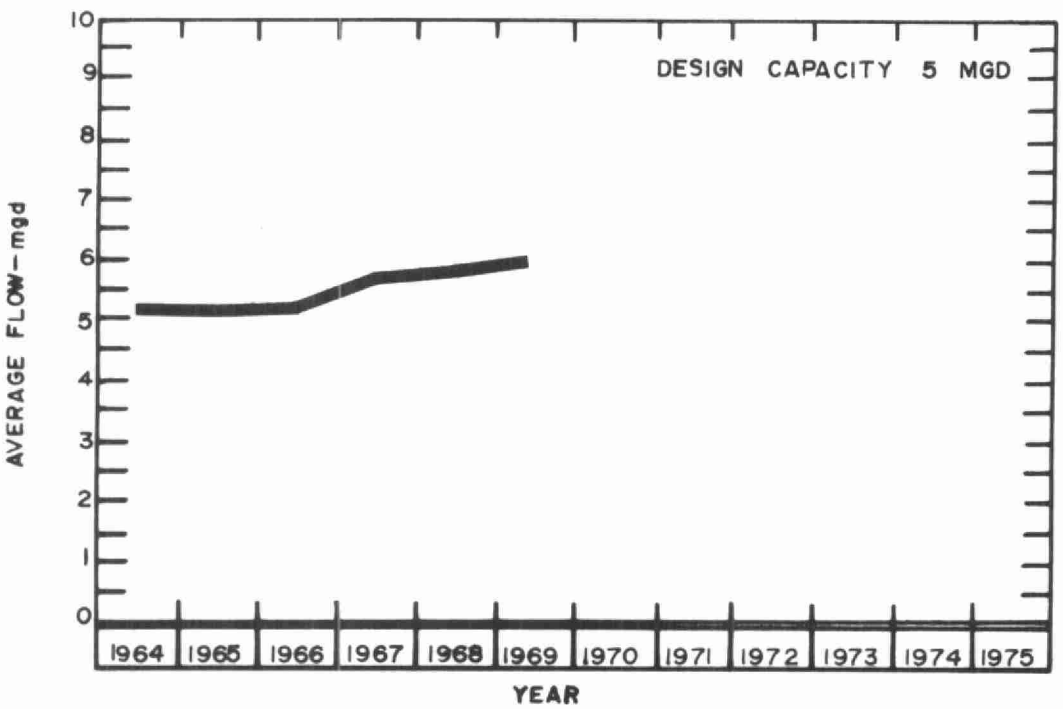
MONTH	TOTAL EXPENDITURE	PAYROLL	CASUAL PAYROLL	FUEL	POWER	CHEMICALS	GENERAL SUPPLIES	EQUIPMENT	REPAIRS and MAINTENANCE	SUNDRY *	WATER	TRAVEL
JAN	8920.15	5582.36	-	-	-	2131.50	45.87	33.50	-	1126.92	-	-
FEB	7167.26	3864.96	-	149.35	784.99	19.70	379.75	648.00	320.42	950.28	11.71	38.10
MAR	6236.67	3805.33	-	-	674.69	-	234.84	41.94	601.00	842.34	6.98	29.55
APR	7235.58	3976.92	-	120.83	782.00	-	487.50	661.02	347.63	825.55	34.13	-
MAY	8303.79	4340.73	77.64	-	822.88	-	387.70	230.00	1635.67	746.94	47.62	25.65
JUNE	7531.00	4199.38	246.82	-	1067.10	-	355.20	167.77	435.93	978.04	44.96	35.80
JULY	9861.27	3915.14	713.08	-	881.59	2133.60	334.76	-	269.83	1440.57	56.71	115.99
AUG	10344.40	5801.22	873.43	-	578.18	125.00	154.32	1764.52	134.94	775.11	137.68	-
SEPT	6405.34	3900.90	34.08	-	775.83	-	324.48	18.35	328.79	887.51	135.40	-
OCT	7455.59	3870.34	-	-	749.03	-	493.38	-	1299.26	891.23	112.60	39.75
NOV	5366.04	3852.14	-	-	776.08	-	197.86	-	373.02	89.75	77.19	-
DEC	9786.07	3969.00	-	126.09	785.31	-	243.61	131.29	987.91	3195.72	105.35	241.79
TOTAL	94613.16	51078.42	1945.05	396.27	8666.68	4409.80	3639.27	3696.39	6734.36	12749.96	770.33	526.63

* SUNDRY INCLUDES SLUDGE HAULAGE COSTS WHICH WERE $10829.91

PROCESS DATA


FLOW - mgd
0
1
2
3
4
5
6
7
8
9
10
2
5
10
15
20
30
40
50
60
70
80
85
90
95
98
PROBABILITY OF OCCURENCE - % ≥ SCALE VALUE

FLOWS

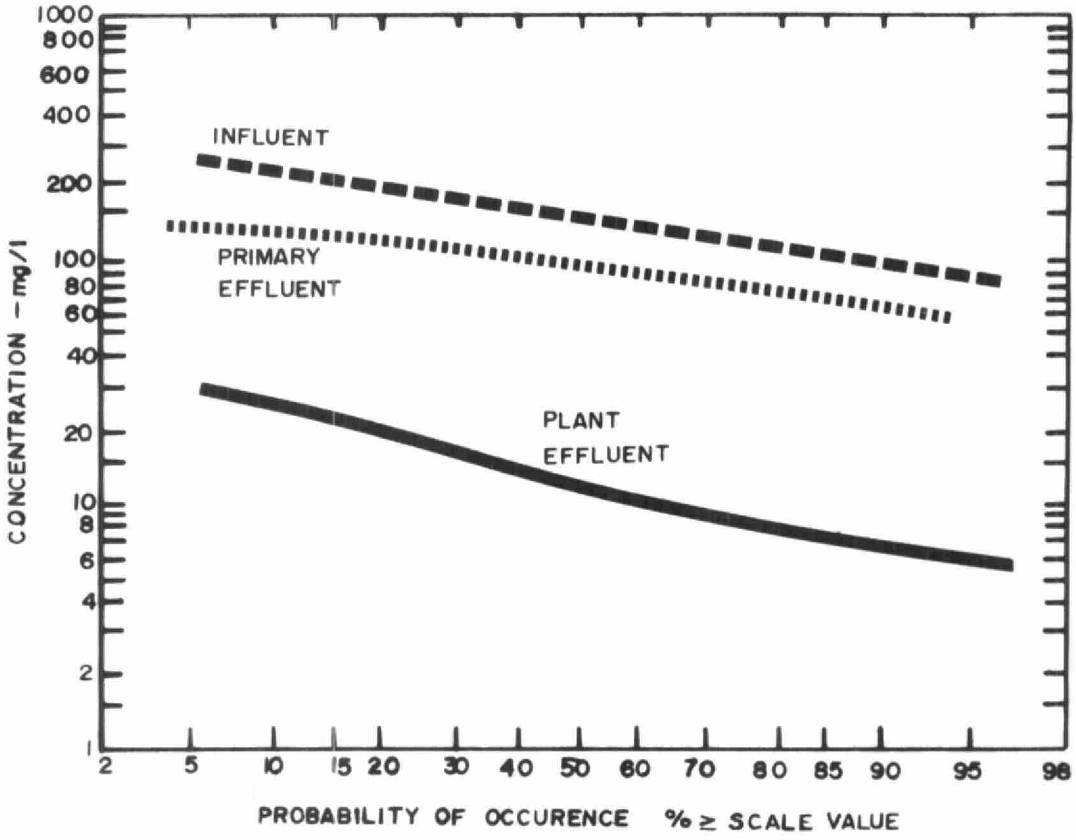

AVERAGE FLOW - mgd
0
1
2
3
4
5
6
7
8
9
10
DESIGN CAPACITY 5 MGD
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
YEAR

PLANT FLOWS and CHLORINATION

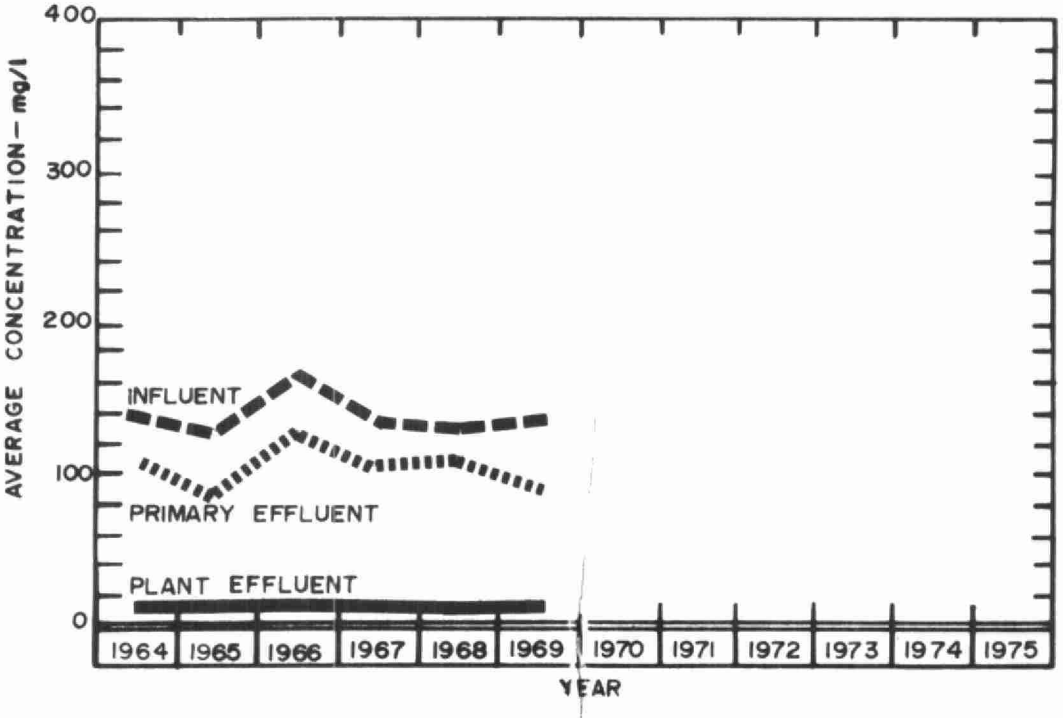
MONTH	TOTAL FLOW mil gal	AVERAGE DAILY FLOW mil gal	MAXIMUM DAILY FLOW mil gal	MINIMUM DAILY FLOW mil gal	CHLORINE USED 10^3 pounds	DOSAGE mg/l
JAN	205.8*	6.6	8.5	5.4	5.58	2.7
FEB	178.1*	6.4	7.4	4.2	5.46	3.1
MAR	o/s **	-	-	-	5.32	-
APR	191.7*	6.4	6.9	5.5	5.75	3.0
MAY	154.3	5.0	7.5	1.8	5.82	3.8
JUNE	186.6	6.2	8.5	4.5	4.66	2.5
JULY	178.2	5.8	7.3	4.0	5.22	2.9
AUG	181.4	5.9	7.8	4.0	4.71	2.6
SEPT	212.5	7.2	6.5	4.4	5.08	2.4
OCT	164.1	5.3	6.2	3.8	4.82	2.9
NOV	175.2	5.8	7.4	4.6	4.48	2.6
DEC	168.7	5.4	6.2	4.5	3.92	2.3
TOTAL	1996.6***	-	-	-	60.81	-
AVERAGE	-	6.0	-	-	5.07	2.8

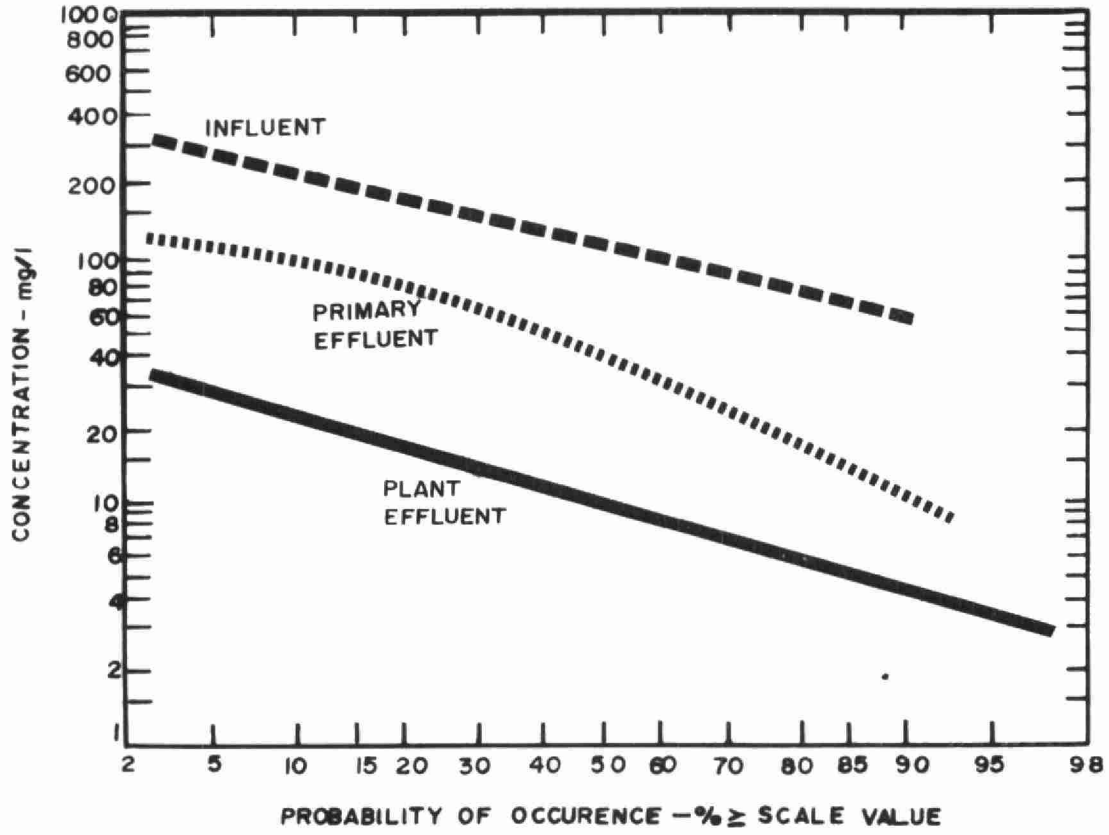
* Flow prorated as follows:
January on 11 days' data
February on 20 days' data
April on 6 days' data

** Not in service
*** Flow for 334 days

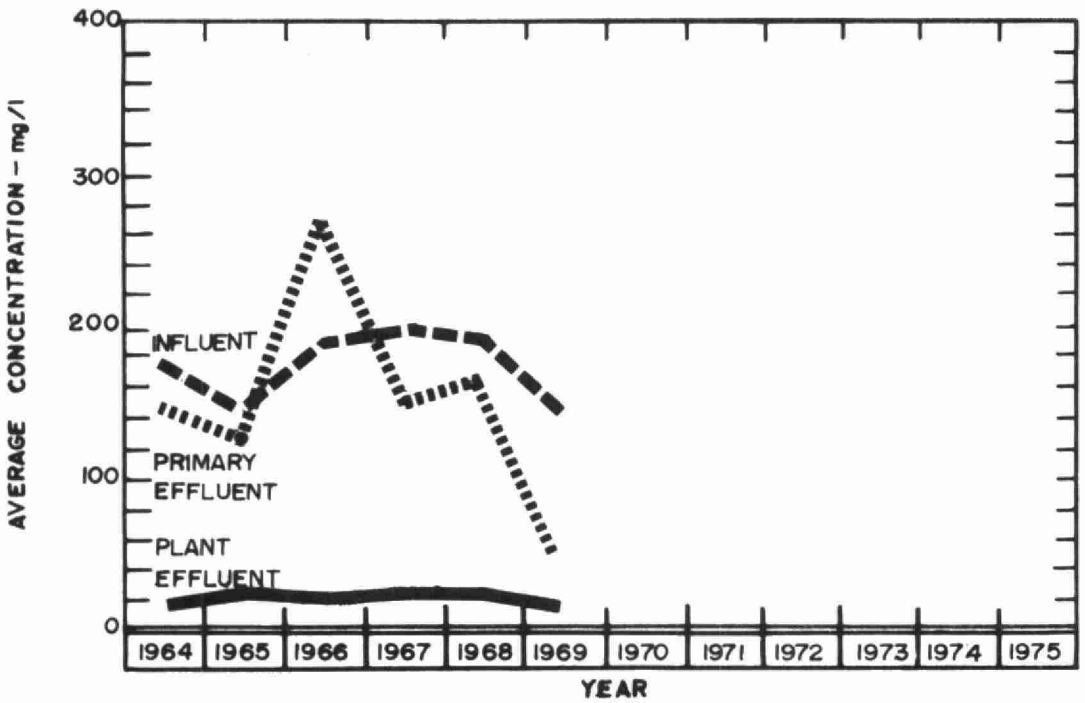


BIOCHEMICAL OXYGEN DEMAND





SUSPENDED SOLIDS

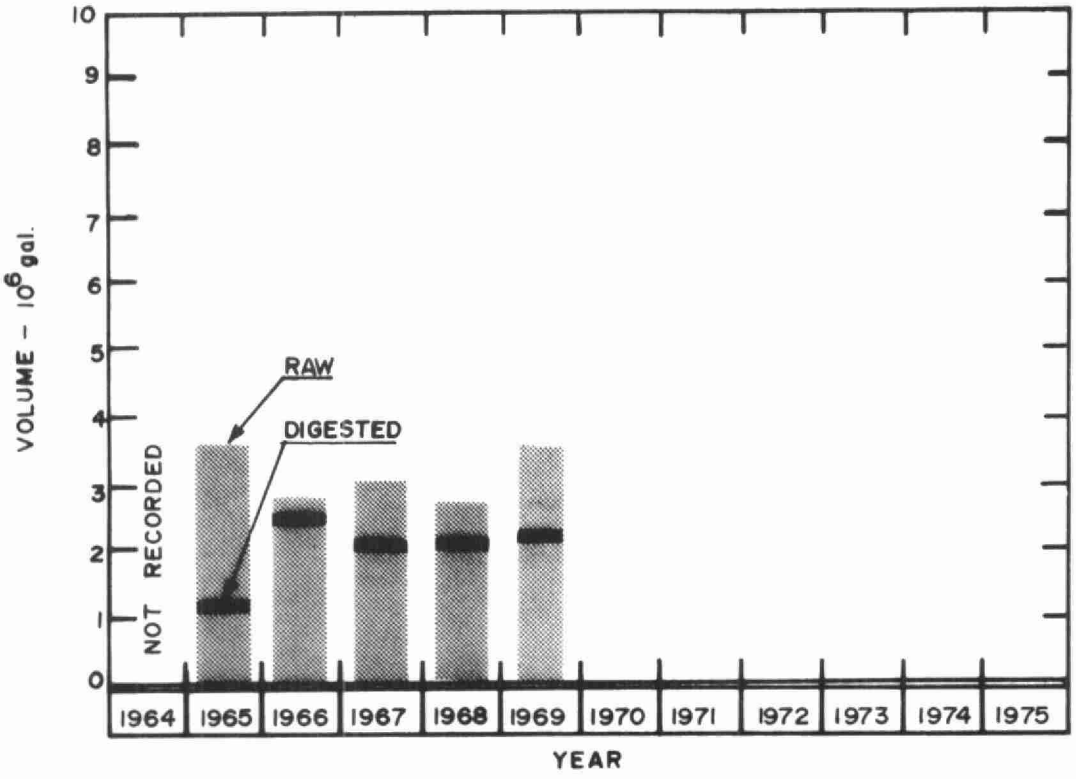


PLANT EFFICIENCY

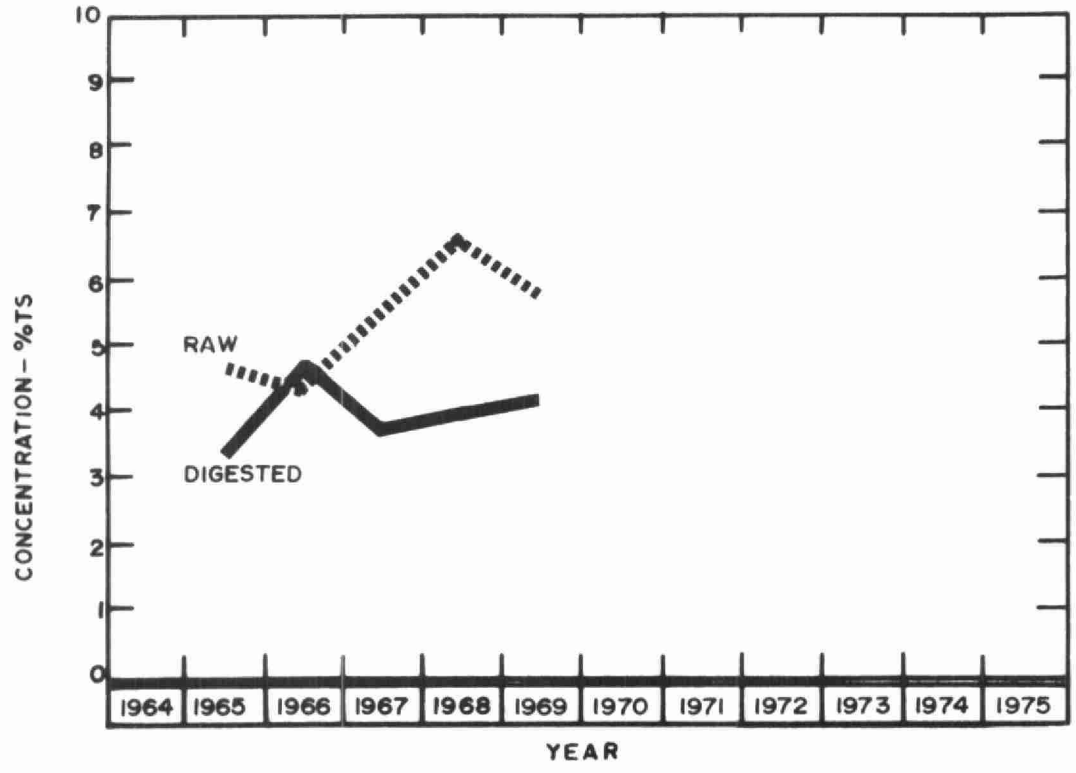
MONTH	BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				GRIT REMOVAL
	INF.	EFF.	REDUCTION		INF. CONCN	EFF. CONCN	REDUCTION		
	mg/l	mg/l	%	10^5 pounds	mg/l	mg/l	%	10^5 pounds	cu ft
JAN	145	30	79	2.37	124	30	76	1.93	15
FEB	130	25	81	1.87	172	30	82	2.57	68
MAR	158	15	91	0	112	16	96	0	15
APR	123	11	91	2.20	86	10	88	1.45	26
MAY	129	11	91	1.82	108	13	88	1.47	14
JUNE	136	13	90	2.30	110	6	94	1.92	6
JULY	143	12	92	2.33	145	8	94	2.44	0
AUG	90	6	93	1.52	128	12	91	2.10	3
SEPT	115	14	88	2.15	165	11	93	3.27	14
OCT	150	11	93	2.28	172	15	91	2.58	70
NOV	220	15	93	3.59	221	17	92	3.57	14
DEC	146	18	88	2.16	190	28	85	2.73	27
TOTAL	-	-	-	-	-	-	-	-	272
AVERAGE	140	15	89	2.24	144	17	88	2.37	23

AERATION

MONTH	AVG DAILY FLOW mil gal	AERATION INF. BOD mg/l	AERATION INF. SS CONCN mg/l	SECONDY. EFF. BOD mg/l	SECONDY. EFF. SS CONCN mg/l	M L S S CONCN mg/l	F/M lb B O D / lb MLSS	AIR USED 1000 cu ft / lb B O D	WASTE SLUDGE 10^3 pounds
JAN	6.6	85	50	14	9	3110	.12	n.a.	39.6
FEB	6.4	115	48	-	20	3150	.16		81.8
MAR	—	94	58	13	13	3150	-		84.2
APR	6.4	96	47	6	12	2780	.15		89.4
MAY	5.0	101	38	7	13	3210	.11		63.4
JUNE	6.2	98	48	13	14	2880	.16		30.0
JULY	5.8	78	41	13	15	2610	.11		18.0
AUG	5.9	55	57	13	10	1980	.11		40.7
SEPT	7.1	114	57	13	16	2660	.21		54.6
OCT	5.3	110	62	21	18	2210	.18		19.1
NOV	5.8	113	58	18	29	3000	.15		20.4
DEC	5.4	100	61	14	25	3340	.11		32.6
TOTAL	-	-	-	-	-	-	-		-
AVERAGE	6.0	97	52	13	16	2840	.14		47.8

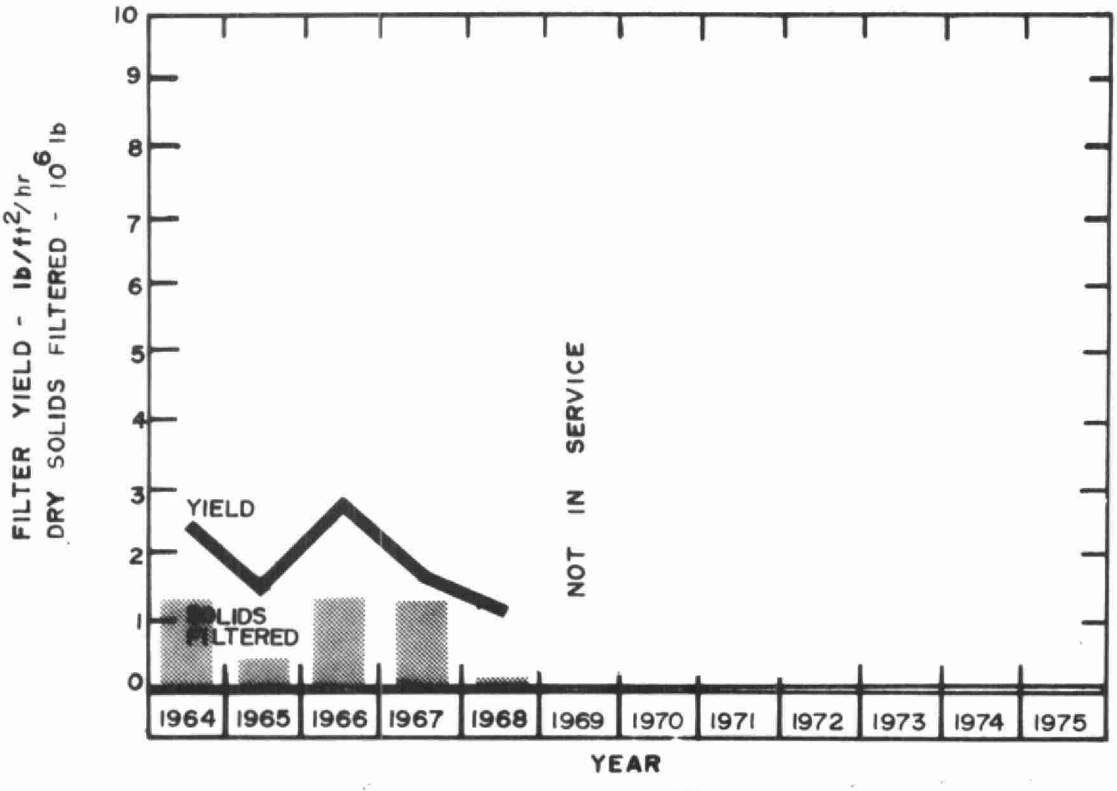

VOLUME - 10^6 gal.
10
9
8
7
6
5
4
3
2
1
0
RAW
DIGESTED
NOT RECORDED
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
YEAR

DIGESTION

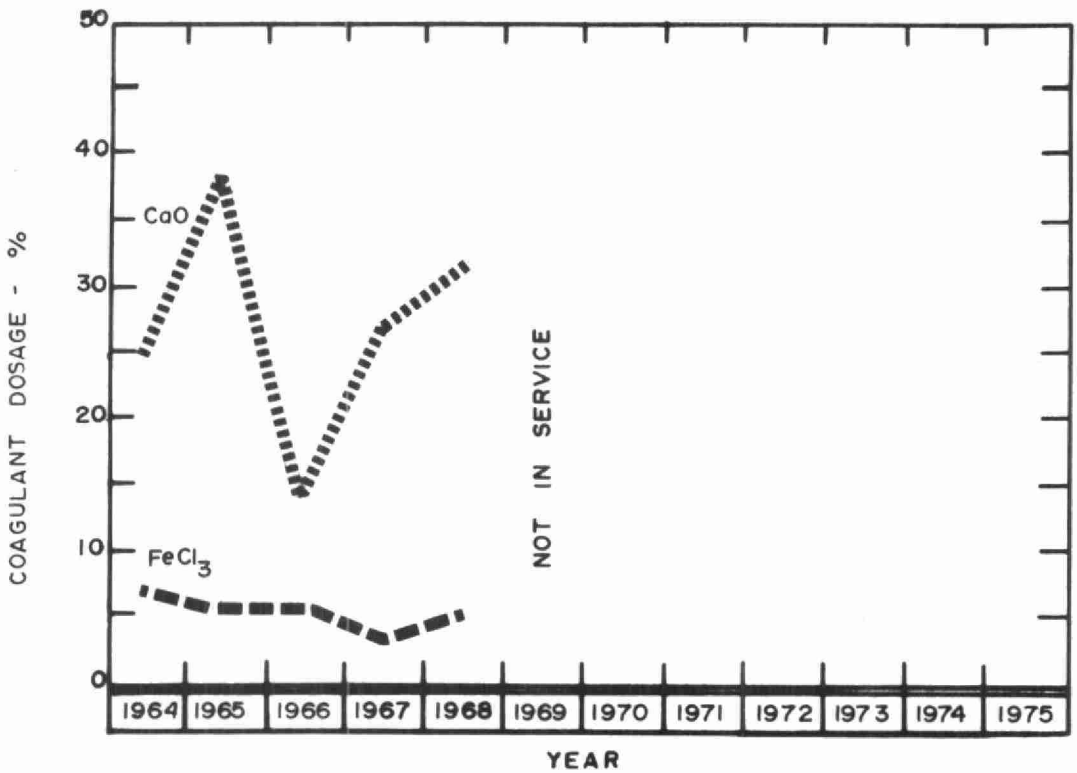

CONCENTRATION - %TS
10
9
8
7
6
5
4
3
2
1
0
RAW
DIGESTED
1964
1965
1966
1967
1968
1969
1970
1971
1972
1973
1974
1975
YEAR

SLUDGE DIGESTION and DISPOSAL

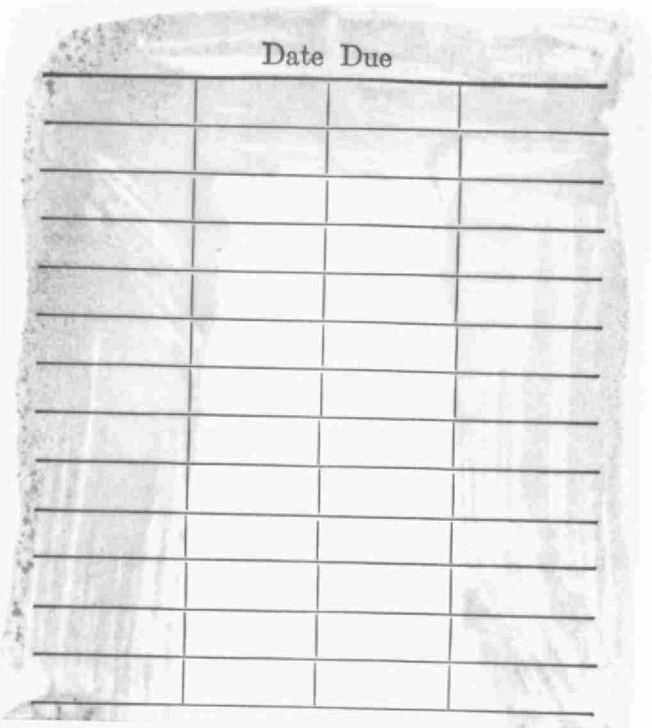
MONTH	RAW SLUDGE			DIGESTED SLUDGE			SUPERNATANT		SLUDGE DISPOSAL	
	VOLUME 10^5 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^5 gal	TOTAL SOLIDS %	VOL SOLIDS %	VOLUME 10^5 gal	TOTAL SOLIDS %	DEWATERED cu yd	LIQUID cu yd
JAN	2.53	5.7	80	1.62	4.1	65	.38	-	0	970
FEB	2.25	6.1	76	1.33	4.5	63	.12	-	0	789
MAR	2.50	6.3	79	1.61	4.1	62	0	-	0	945
APR	2.61	6.5	75	1.31	3.7	62	.87	-	0	774
MAY	3.47	5.7	75	1.93	5.0	61	.64	-	0	1136
JUNE	3.00	4.8	74	2.84	3.7	60	.77	-	0	1671
JULY	3.36	5.5	76	1.55	3.7	61	.89	-	0	910
AUG	3.24	5.0	76	1.66	3.8	62	.88	-	0	980
SEPT	3.37	7.3	74	1.73	4.0	64	.12	-	0	1022
OCT	3.81	6.1	75	2.39	4.2	61	.10	-	0	1449
NOV	3.12	6.3	74	1.42	4.4	63	.48	-	0	840
DEC	2.71	6.0	78	2.58	4.8	62	.15	-	0	1526
TOTAL	35.97	-	-	21.97	-	-	5.40	-	0	13012
AVERAGE	3.00	5.9	76	1.83	4.2	62	.49	-	0	1084



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